APPENDIX C

SURFACE DISTURBANCE THRESHOLDS

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SURFACE DISTURBANCE THRESHOLDS

During the internal scoping process for this EIS, numerous comments were received that expressed concern over the level and success of previous reclamation efforts in the WTP Project Area. Therefore, under all BLM alternatives, limits have been placed on the amount of unreclaimed surface disturbance. The thresholds established in this EIS include the total amount of surface disturbance that would be allowed at any one time, and are based upon total past, present, and proposed oil and gas development in the WTP Project Area. The goal of establishing surface disturbance thresholds is to ensure successful interim reclamation is achieved and to mitigate impacts to vegetation, soil, and water resources by re-establishing a vegetation community as soon as practical.

Past and Present Oil and Gas Disturbance in the WTP Project Area

Surface disturbance associated with oil and gas development has been occurring in the WTP Project Area since the 1950s with the most recent development approved under the West Tavaputs Plateau Drilling Program EA (UT-070-2004-28) and through the use of the Categorical Exclusion process (authorized by Section 390 of the 2005 Energy Policy Act).

According to BLM records (*West Tavaputs Master Disturbance – By Lease*), the total amount of surface disturbance related to oil and gas development that predates the WTP Drilling EA is approximately 232 acres. Given that some of the disturbance could date back to the 1950s, for analysis purposes, it is assumed that all of this is long-term disturbance.

The WTP Drilling Program EA, approved by BLM on July 29, 2004, authorized the short-term disturbance of approximately 255 acres in the WTP Project Area. Though no long-term disturbance estimates were provided in the document, it is assumed that following successful reclamation, surface disturbance would be 127 acres (approximately 50 percent of initial surface disturbance).

Therefore, the total amount of short-term surface disturbance from oil and gas development in the WTP Project Area prior to this EIS is approximately 487 acres (232 acres pre-WTP Drilling Program EA plus 255 acres WTP Drilling Program EA). Total long-term disturbance would be approximately 359 acres (232 acres pre-WTP Drilling Program EA plus 127 acres WTP Drilling Program EA).

Proposed Oil and Gas Disturbance in the WTP Project Area

Surface disturbance thresholds established for development proposed in this EIS vary per alternative. The following narrative and tables describe how surface disturbance thresholds were developed.

For each alternative, annual short-term surface disturbance was calculated by taking the total short-term surface disturbance and dividing by the total number of wells proposed during the development phase, resulting in a per well disturbance in acres. The *annual* short-term disturbance was then calculated by multiplying the disturbance per well by the number of wells expected to be drilled in a given year.

Similarly, for each alternative, annual long-term surface disturbance was calculated by taking the total long-term surface disturbance and dividing by the total number of wells proposed during the development phase, resulting in a per well disturbance in acres. The *annual* long-term disturbance was then calculated by multiplying the disturbance per well by the number of wells expected to be drilled in a given year.

Based upon the climatic conditions of the WTP Project Area, it was determined that successful interim reclamation could be reasonably expected to occur within a period of 5 years. Therefore, successful interim reclamation of areas disturbed during the first year of the project would be expected by the fifth year.

The *net disturbance* in any given year is calculated by subtracting the reclaimed acreage from the annual short-term disturbance.

The *total disturbance* is calculated by taking the summation of the net disturbance from each year of the drilling phase.

Because successful interim reclamation occurs after 5 years of the initial disturbance, reclamation efforts will still be underway even after development is complete. Therefore, at a specific point in all alternatives, the annual net disturbance to the WTP Project Area becomes negative. A negative net disturbance indicates that in that year, more acres are reclaimed than are disturbed. Peak acreage disturbance occurs the year before the negative net disturbance trend begins. Therefore, *maximum allowable disturbance* is determined by summing annual net disturbance up to the point at which the net disturbance becomes negative.

Another component of the following tables is *total short-term disturbance,* which is the summation of annual disturbance. The total short-term disturbance does not take into account any interim reclamation.

The last component of **Tables C-1**, **C-2**, and **C-3** is the determination of the *total long-term disturbance*. Total long-term disturbance is the disturbance left after reclamation efforts are complete, which is calculated by summing the net disturbance acres for all years.

Unreclaimed surface disturbance associated with construction of the following would count toward the maximum allowable surface disturbance:

- Well pads
- Pipelines (e.g., gas, condensate, or water)
- Compressors stations, worker housing locations, pump stations, equipment storage areas, aggregate barrow areas, water management facilities, and other any other surface facility
- Borrow ditches, water diversion structures, and cut/fill slopes on any road used for oil and gas access
- Construction of new routes and realignment, widening or other improving of exiting routes used for oil and gas

Tables C-1, **C-2**, and **C-3** show the disturbance thresholds for each alternative.

Table C-1. Disturbance Thresholds under Alternative C					
Year	**Number of Wells**	**Annual Disturbance (acres)**	**Annual Reclaimed Acreage**	**Net Disturbance (acres)[1]**	**Total Disturbance (acres)**
1	62	279	0	279	279
2	62	279	0	279	558
3	62	279	0	279	836
4	62	279	0	279	1,115
5	62	279	138	141	1,256
6	62	279	138	141	1,396
7	52	234	138	96	1,492
8	52	234	138	96	1,587
9	52	234	138	96	1,683
10	52	234	138	96	1,778
11	52	234	116	118	1,896
12	52	234	116	118	2,014
13	52	234	116	118	2,132
14	52	234	116	118	**2,250**
15	19	85	116	-31	2,219
16			116	-116	2,103
17			116	-116	1,988
18			116	-116	1,872
19			42	-42	1,829
Total Short-Term Disturbance				**3,640**	
Maximum Allowable Disturbance				**2,250**	
Total Long-term Disturbance				**1,839**	

[1]Net Disturbance is equivalent to the reclaimed acreage subtracted from the annual disturbance.

As shown in **Table C-2**, if Alternative D were implemented maximum new annual surface disturbance would be limited to approximately 180 acres. In addition, total unreclaimed surface disturbance would be limited to approximately 1,442 acres at any given time. Following successful interim reclamation, the maximum long-term disturbance would be 1,237 acres.

Table C-2. Disturbance Thresholds under Alternative D					
Year	**Number of Wells**	**Annual Disturbance (acres)**	**Annual Reclaimed Acreage**	**Net Disturbance (acres) [1]**	**Total Disturbance (acres)**
1	40	180	0	180	180
2	40	180	0	180	360
3	34	153	0	153	513
4	34	153	0	153	666
5	28	126	91	35	701
6	28	126	91	35	735
7	24	108	78	30	766
8	24	108	78	30	796

Table C-2. Disturbance Thresholds under Alternative D					
Year	**Number of Wells**	**Annual Disturbance (acres)**	**Annual Reclaimed Acreage**	**Net Disturbance (acres)** [1]	**Total Disturbance (acres)**
9	24	108	64	44	840
10	24	108	64	44	884
11	24	108	55	53	937
12	24	108	55	53	991
13	24	108	55	53	1,044
14	24	108	55	53	1,097
15	24	108	55	53	1,150
16	24	108	55	53	1,203
17	24	108	55	53	1,257
18	24	108	55	53	1,310
19	24	108	55	53	1,363
20	24	108	55	53	1,416
21	18	81	55	26	**1,442**
			55	-55	1388
			55	-55	1333
			55	-55	1278
			41	-41	1237
Total Short-Term Disturbance				**2,510**	
Maximum Allowable Disturbance				**1,442**	
Total Long-term Disturbance				**1,237**	

[1]Net Disturbance is equivalent to the reclaimed acreage subtracted from the annual disturbance.

As shown in **Table C-3**, if Alternative E were implemented maximum new annual surface disturbance would be limited to approximately 539 acres. In addition total unreclaimed surface disturbance would be limited to approximately 2,309 acres at any given time. Following successful interim reclamation, the maximum long-term disturbance would be 1,678 acres.

Table C-3. Disturbance Thresholds under the Agency Preferred Alternative					
Year	**Number of Wells**	**Annual Disturbance (acres)**	**Annual Reclaimed Acreage**	**Net Disturbance (acres)** [1]	**Total Disturbance (acres)**
1	128	539	0	539	539
2	127	535	0	535	1,074
3	120	505	0	505	1,579
4	80	337	0	337	1,916
5	80	337	269	68	1,985
6	80	337	267	70	2,055
7	80	337	252	85	2,140
8	80	337	168	169	**2,309**

Table C-3. Disturbance Thresholds under the Agency Preferred Alternative					
Year	**Number of Wells**	**Annual Disturbance (acres)**	**Annual Reclaimed Acreage**	**Net Disturbance (acres)** [1]	**Total Disturbance (acres)**
9	32	135	168	-33	2,276
10		0	168	-168	2,108
11		0	168	-168	1,940
12		0	168	-168	1,772
13		0	67	-67	1,705
Total Short-Term Disturbance				**3,339**	
Maximum Allowable Disturbance				**2,309**	
Total Long-term Disturbance				**1,678**	

[1]Net Disturbance is equivalent to the reclaimed acreage subtracted from the annual disturbance.

Cumulative Oil and Gas Disturbance within the WTP Project Area

Cumulative oil and gas development within the WTP Project Area includes all past, present and proposed oil and gas disturbances.

Table C-4 below calculates the *cumulative short-term disturbance* to the WTP Project Area under each alternative by adding the oil and gas development occurring from 1950 until 2004, the development authorized under the 2004 WTP Drilling Program, and the proposed disturbance associated with this EIS.

Alternatives C, D, and E would have a cumulative short-term surface disturbance of 4,127 acres, 2,997 acres, and 3,826 acres, respectively.

Table C-4. Total Short-Term Disturbance within the WTP Project Area				
Alternative	**Existing Surface Disturbance Pre-Drilling EA**	**Approved Surface Disturbance under 2004 Drilling EA**	**Proposed Surface Disturbance within WTP EIS**	**Cumulative O&G Surface Disturbance within WTP Project Area**
Alternative C	232	+255	+3,640	= 4,127
Alternative D	232	+255	+2,510	= 2,997
Alternative E	232	+255	+3,339	= 3,826

The *cumulative maximum allowable surface disturbance*, as shown in **Table C-5**, adds the following three components for every alternative:

1) Pre-existing surface disturbance due to oil and gas development from 1950 through 2004 (i.e., 232 acres for all alternatives);
2) Projected long-term surface disturbance from the 2004 WTP Drilling EA, following successful reclamation of 50 percent of initial disturbance (i.e., 127 acres for every alternative); and
3) Maximum allowable disturbance for each scenario under this proposed EIS (as calculated in **Tables C-1**, **C-2**, and **C-3**).

Table C-5. Maximum Allowable Surface Disturbance within the WTP Project Area at Any Given Time				
Alternative	**Existing Surface Disturbance Pre-Drilling EA**	**Projected Long-term Surface Disturbance (from 2004 Drilling EA) following successful interim Reclamation**	**Maximum Allowable Disturbance under the WTP EIS**	**Cumulative Maximum Allowable Surface Disturbance**
Alternative C	232	+127	+2,250	= 2,609
Alternative D	232	+127	+1,442	= 1,801
Alternative E	232	+127	+2,309	= 2,668

Under Alternatives C, D, and E, the cumulative maximum allowable surface disturbances are 2,609 acres, 1,799 acres and 2,668 acres, respectively.

The remaining allowable surface disturbance is calculated in the following table, after taking into account the cumulative impacts from **Table C-5**. For each alternative, total existing surface disturbance that has occurred in the WTP Project Area as of September 2007 (i.e., 458 acres) is subtracted from the cumulative maximum allowable disturbance.

Table C-6. Remaining Allowable Surface Disturbance within the WTP Project Area			
Alternative	**Cumulative Maximum Allowable Surface Disturbance (acres)**	**Total Existing* Surface Disturbance (acres)**	**Cumulative Remaining Allowable Surface Disturbance (acres)**
Alternative C	2,609	- 458	= 2,151
Alternative D	1,799	- 458	= 1,341
Alternative E	2,668	- 458	= 2,210

*Existing surface disturbance equals all surface disturbances from oil and gas activities that had occurred in the WTP Project Area as of September 2007.

The *cumulative remaining allowable surface disturbance* for Alternative C is 2,151 acres, 1,341 acres for Alternative D, and 2,210 acres for Alternative E.